Space Weather Forecast

Issued on Monday, 24 June 2024 at 13:23 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Further Moderate class flares expected, with a chance of Strong-class flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate with peak flare at 23/1301 UTC from the returning sunspot in the southeast. A very long duration Moderate flare, was also observed from one of the sunspot regions on the southwest limb. There are twelve sunspot regions on the disc, although a couple of these are soon rotating off the southwest disc, following one that rotated off early today. The most notable is in the southeast, and is a complex, longitudinally wide, but small in area region. Further details are likely to become apparent as it rotates into view. Some slow growth has also been observed in a further region closer to the centre disc, but also in the southeast quadrant, although this is now maturing into a slightly simpler region.

A couple of coronal mass ejections (CMEs) have been observed due to filament eruptions. These are lines of plasma that can be released from the Sun due to changes in the Sun's magnetic field. This includes an eruption off the south-disc, just west of centre, however this forecast to miss Earth, likely passing to the south and west. A further filament eruption has been observed from the northwest (around 24/0600 UTC), however available coronagraph imagery is currently not sufficient to determine if a CME has been released. A further bright CME was also observed from the very long duration Moderate flare, however this was from just over the southeast limb.

Solar Wind / Geomagnetic Activity: Solar wind speeds were at background easing from around 350 km/s to near 300km/s. Interplanetary Magnetic Field was moderate at first, but soon eased to be weak. North-south component was also weak, and favoured a positive (northward) direction since 24/0000 UTC. Geomagnetic activity was Quiet to Unsettled (Kp 0-3)

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) has remained at background levels with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Further Moderate flares are expected, with a chance of isolated Strong flares, most likely from one of the large sunspots near the western limb, or from the more notable region in the southeast.

Solar Wind / Geomagnetic Activity: There are no CMEs currently assessed as Earth-directed, although imagery is awaited to fully assess the eruptions on 24 Jun. There is a very slight chance of a glancing interaction from a passing CME on day 4 (27 Jun), due to a southwest disc eruption on 23 Jun however this is very low confidence. Otherwise solar winds are expected to remain near background with no notable enhancements forecast. Geomagnetic activity is forecast to be mainly Quiet, with only isolated Unsettled intervals. Any CME arrivals later in the period bring a slightly increased risk of Active to G1 Minor Storm intervals.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to be at background levels, but with a slight chance of exceeding the

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S1/Minor Storm threshold should any notable flares occur from any of the three large spots in the western hemisphere.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	1	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	80	75	70	60
Very Active	R3 to R5 X	No	25	20	15	15

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	10	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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